TRANSLATION

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Form PCT/IPEA/416
443520EH		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/EP2004/012988	16.11.2004	20.11.2003

International Patent Classification (IPC) or national classification and IPC

G01N33/543

Applicant

NOVEMBER AKTIENGESELLSCHAFT

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 8 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

   a. ☐ *(sent to the applicant and to the International Bureau)* a total of _____ sheets, as follows:

      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))

      _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/012988

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

☐ international search (Rule 12.3 and 23.1(b))

☐ publication of the international application (Rule 12.4)

☐ international preliminary examination (Rule 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ the international application as originally filed/furnished

☒ the description:

pages 1-17 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

nos. 1-30 as originally filed/furnished

nos.* _____ as amended (together with any statement) under Article 19

nos.* _____ received by this Authority on _____

nos.* _____ received by this Authority on _____

☒ the drawings:

sheets 1/5-5/5 as originally filed/furnished

sheets* _____ received by this Authority on _____

sheets* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/012988

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-12, 14-30	YES
	Claims	13	NO
Inventive step (IS)	Claims	1-12	YES
	Claims	13-30	NO
Industrial applicability (IA)	Claims	1-30	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

1. This report makes reference to the following documents:

D1: WO 02/43865 A

D2: WO 03/049530 A

D3: DE 101 11 520 A1

D4: US 2003/095897 A1

D5: WO 2004/096443 A (NOVEMBER AG GESELLSCHAFT FÜR MOLEKULARE MEDIZIN; BART), 11 November 2004 (2004-11-11)

2. Novelty (PCT Article 33(1) and 33(2))

2.1 Claim 13:

Document D1, which is considered to represent the closest prior art, discloses a device which comprises:

- a first container (figure 3, [3]) for providing or receiving a first liquid and paramagnetic microparticles (abstract);
- a first pipe that opens into the first container (figure 1, [15, 13]); and
- a section of the first pipe which, in relation

to the remaining cross-sectional area of the first pipe, has an enlarged cross-sectional area (figure 1, [15, 13]);

- a first magnet or a first recess for receiving a first magnet for generating a first magnetic field in a zone of the first container and in the pipe section (figure 3); or
- a first magnet or a first recess for receiving a first magnet for generating a first magnetic field in a zone of the first container, and a second recess for receiving a second magnet for generating a second magnetic field in the pipe section (figure 3);
- the zone, the pipe section and the first recess or first magnet, as well as, if provided, the second recess, are arranged and/or shaped in such a way that the magnetic field inside the pipe section has a stronger average field intensity than the magnetic field inside the first container (figure 3).

The subject matter of claim 13 is therefore not novel. It should also be noted that, owing to the use of "or" in claim 13, the second magnet is not a feature of the device claim.

It should also be noted that the difference from the device disclosed in D4 (claim 55), in comparison with claim 13, is that no enlarged section in relation to the section of the first pipe is disclosed. However, D4 discloses the

arrangement of a plurality of magnets along the liquid path.

3. Inventive step (PCT Article 33(1) and 33(3))

3.1 Claim 1:

Document D1, which is considered to represent the closest prior art, discloses improved purification processes for a first substance (abstract) bound to paramagnetic microparticles (abstract), the microparticles being suspended in a first liquid (claim 1). The processes have the following steps:

(a) the microparticles are exposed in a first container to a first magnetic field in order to retain them and prevent them from being washed away with a stream of a first liquid (claim 1, figure 1); and

(b) at least part of the first liquid is led after step (a) in a first direction through a first pipe, through a section (figure 1, [5]) of the first pipe.

The subject matter of claim 1 differs from the above in that

part of the first liquid in the section (figure 1, [5]) is exposed to a second or to the first magnetic field in order to retain microparticles which have nevertheless been washed away, the cross-sectional area of the first pipe being enlarged in the section, and the second or first

magnetic field inside said section having a stronger average field intensity than the first magnetic field inside the first container.

The subject matter of claim 1 is thus novel (PCT Article 33(2)).

The present invention can therefore be considered to address the problem of devising a particularly effective process for retaining paramagnetic particles.

The solution to this problem, as proposed in claim 1 of the present application, involves an inventive step (PCT Article 33(3)) for the following reasons:

D1 proposes a process for conveying and concentrating magnetic particles. A solution A, in which the analyte is bound to magnetic particles, is poured into a vessel (1) linked to a second vessel by a pipe. The analyte bound to the magnetic particles is conveyed into the second vessel by means of a magnet. D1 does not use the first magnet or a second magnet at another location in the delivery pipe or in a second vessel in order to retain the microparticles.

D2 describes a process for washing magnetic particles in which the magnetic particles are led through a throughflow cell and retained by a magnet in a first zone, then the magnetic field is

switched off and the magnetic particles are stirred. Stirring can be carried out by switching the magnetic field on and off. D2 does not use the first magnet or a second magnet at another location of a delivery pipe or in a second vessel in order to retain the microparticles.

D3 describes a process and device for purifying biomolecules by means of magnetic particles. Firstly, magnetic particles are added to the starting solution, and the starting solution is mixed. The magnetic particles are prepared in such a way that they selectively bond to biomolecules in the resultant suspension, either immediately or after admixture of a binding buffer. The suspension is then introduced into a flexible tube that goes through a strong magnetic field. The particles are retained therein and can be washed. After the magnetic field is removed, the particles can be suspended again. That process is characterised by handling in a metering system comprising canulae, flexible tube and metering syringe (dilutor), the suspension being led in a flexible tube through the magnetic field. The magnetic particles are purified with various washing buffers in the flexible tube of the metering system, permitting even the smallest volumes to be handled without losses. The embodiment described permits multiple washing buffers to be received in the flexible tube before the suspension, and the particles to be washed without having to go through separate vessels

containing washing solutions.

D4 describes a process in which a mixture of magnetic particles is led past a magnet in one direction, then led during a subsequent step in another direction past the magnet (claim 37). D4 also describes an apparatus having a plurality of magnetic fields arranged at a fixed location of a liquid path (claim 55). D4 does not describe different cross-sectional areas in an additional pipe, besides the first pipe, or a second or first magnetic field having a stronger average field strength inside the pipe section.

Either alone or in combination, the documents fail to suggest the claimed process. The subject matter of claim 1 and of its dependent claims is thus inventive in relation to the citations.

3.2 Claims 14-30:

Dependent claims 14-30 do not contain any features which, in combination with the features of any claim to which they refer, meet the PCT inventive step requirements.